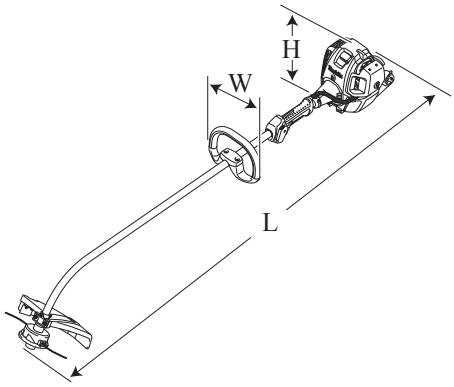
TECHNICAL INFORMATION

Models No. ► ER2650LH

Description ► Petrol String Trimmer



Dimensions: mm (")	
Length (L)	1,621 (64)
Width (W)	310 (12-1/4)
Height (H)	479 (18-7/8)

CONCEPT AND MAIN APPLICATIONS

Model ER2650LH is a petrol string trimmer equipped with 25.4cm³ 4-stroke engine in compliance with all known exhaust emission regulations.

► Specification

Engine	Model	EH026
	Type	4-stroke
	Displacement: cm³ (cu.in.)	25.4 (1.5)
	Fuel	Straight unleaded gasoline
	Max. output: kW (PS)	0.77 (1.1)
	Max. torque: N.m	1.1 (at 5,500 min.$^{-1}$)
Speed: min.$^{-1}$=spm	at max. output power	7,000
	at no load	10,000
	with nylon cutting head (nylon cord diameter: mm)	7,900 (2.4)
Engine oil		SAE10W-30 oil in the Class SF or higher of API classification
Carburetor		Diaphragm
Starting system		Recoil starter, with mechanical decompression
Fuel tank capacity: L (US oz)		0.6 (20.3)
Primer pump		Yes
Clutch		Yes
Spindle size		M8 x 1.25, Right-handed
Cutting width: mm (")		412 (16-1/4)
Handle style		Loop handle
Rapid start		No*1
Dry weight*2: kg (lbs)		4.8 (10)

***1:** However, equipped with mechanical decompression
***2:** without guard, cutting tool

► Standard equipment

Nylon cutting head 1
Socket wrench (for 10-16) 1
Hex wrench 4 1
Pin 4 1
Accessory bag 1
Oil set (oil bottle containing 80mL engine oil) 1

Note: The standard equipment for the tool shown may vary by country.

► Optional accessories

Nylon cutting heads [Bump & feed 4, Ultra Auto 4]

► Repair

CAUTION: Repair the machine in accordance with “Instruction manual” or “Safety instructions”.

[1] NECESSARY REPAIRING TOOLS

Code No.	Description	Use for
1R004	Retaining ring pliers ST-2 for External ring	removing/ assembling Retaining rings S-12 and S-24
1R127	Air density tester	diagnosing Carburetor
1R171	T-type hex. wrench 4-130	removing / assembling M5 Hex socket head bolt
1R247	Round bar for arbor 20-100	removing Clutch drum and Ball bearing 6001LLU
1R286	Round bar for arbor 12-50	press-fitting Clutch drum
1R308	Spring pin extractor 4.0	holding Cutter holder
1R364	Flywheel puller	removing Flywheel
1R366	Feeler gauge set	Adjusting Ignition coil, Spark plug and Rocker arm assembly
---	Hex socket bit 13	removing / assembling Flywheel
---	Wire brush	cleaning Spark plug

[2] GASKET

(1) Replace the removed gasket with the new one.
(2) Clean the matching surface where the gasket is placed to maintain its sealing performance.

[3] LUBRICANT / ADHESIVE APPLICATION

(1) Apply Makita grease N No.2 to Spiral spring in Recoil starter and the spline ends of Shaft.
(2) Apply Liquid gasket; ThreeBond 1215, to the matching surface of
Crank case and Cylinder block when assembled. (**Fig. 55**)

[4] DISASSEMBLY/ASSEMBLY

[4]-1. Attention

Follow the instructions below during repairing**.**

- Wear glove to avoid injury.
- Cool down the engine enough before repairing to avoid skin burn.
- Remove the remaining fuel in Tank and Carburetor completely. Note; No open flames in the workshop.
- Repair the tool on the stable workbench and keep dust out.
- Record where and how the parts are assembled to avoid mis-assembling. And assort and keep the disassembled parts in the box by section.
- Treat the disassembled parts carefully. Be sure to clean and wash parts before assembling.
- Use Impact driver if bolts and screws can not be loosen.
- Tighten the bolts and the screws to the specific torque as listed in **Fig. 59**.
- Check the movement and sound of the main parts by manually turning each part once assembled.
- Check the assembled parts by manually turning them if there is any faulty or unusual gap.

► Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-2. Engine and Shaft

DISASSEMBLING

(1) Disconnect lead wire and grounding wire by removing each connector after Air cleaner cover is removed. (**Fig. 1**)
(2) Remove Control cable from Insulator by loosening nuts of the adjust screw and disconnecting inner cable from Swivel of Carburetor. (**Fig. 2**)

Fig. 1

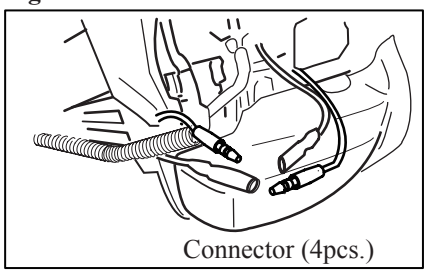
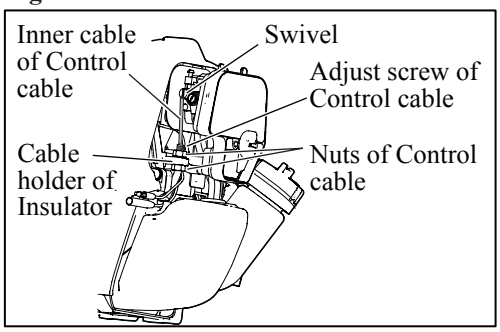


Fig. 2



(3) Loosen two M5x18 Hex socket head bolts on Pipe holder and remove M5x12 Hex socket head bolt. (**Fig. 3**)
(4) Pull out Shaft pipe complete from Engine (Pipe holder). (**Fig. 4**)
Note: Cover cloth on a shaft and pull out it by grasping it with Waterpump pliers in case the shaft is stuck at the spline engagement. (**Fig. 5**).

Fig. 3

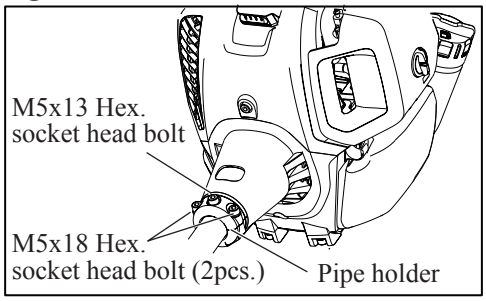


Fig. 4

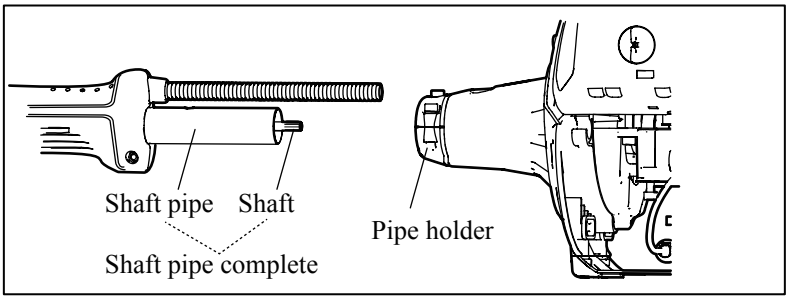
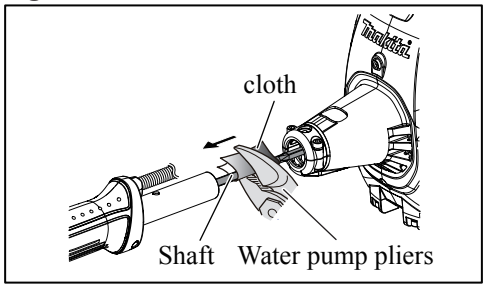


Fig. 5

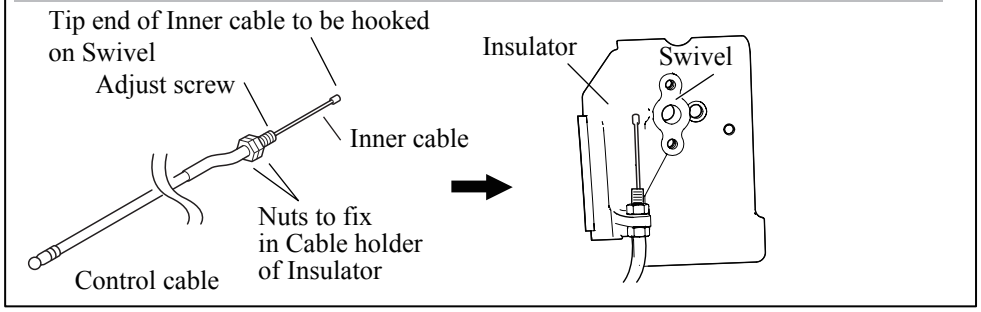


ASSEMBLING

Take the reverse step of disassembly. Set Control cable in place. (**Fig. 2, Fig. 6**)

Fig. 6

Hook the tip end of Inner cable in the groove of Swivel on Carburetor and fix Control cable in the Cable holder of Insulator by tightening Nuts of Control cable.
Note: Adjust the tension of the cable to allow the play 1mm to 2mm.



Repair

[4] DISASSEMBLY/ASSEMBLY
[4]-3. Shaft pipe complete

DISASSEMBLING

(1) Loosen two M5x25 Hex socket head bolts and remove Clamp cover B and Loop handle. (**Fig. 7**)
(2) Remove 4x18 Tapping screws (4pcs) and M5x14 Hex socket head bolts, then separate Lever case R and L. (**Fig. 8**)

Fig. 7

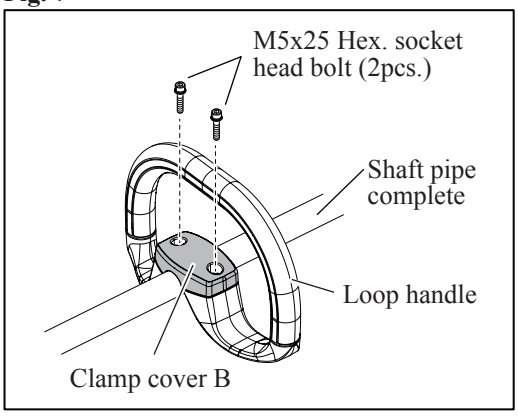
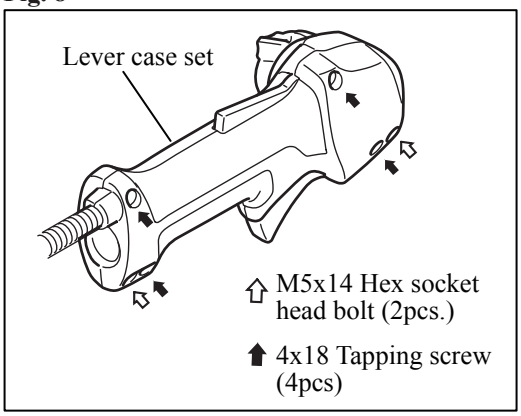


Fig. 8



(3) Disassemble Shaft pipe complete by following the disassembly step of the chapter **[4]-2**.
(4) Pull out a shaft from Shaft pipe complete.

ASSEMBLING

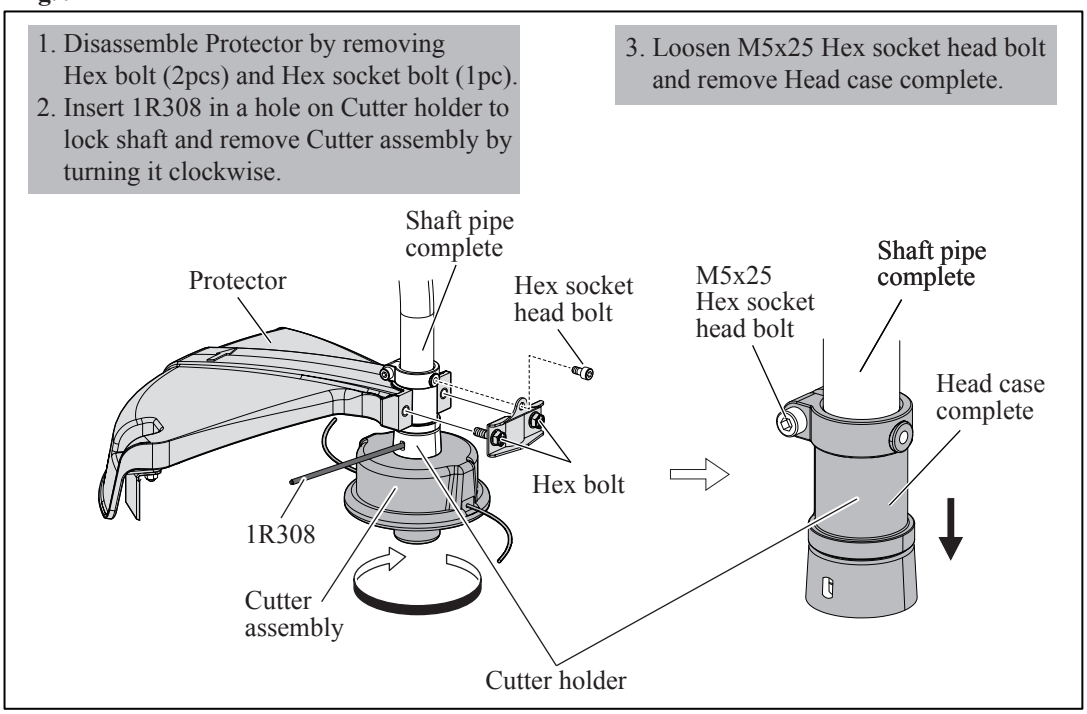
Take the disassembling step in reverse.

[4] DISASSEMBLY/ASSEMBLY
[4]-4. Head case complete

DISASSEMBLING

(1) Disassemble Protector and Head case complete. (**Fig. 9**)

Fig. 9



Repair

[4] DISASSEMBLY/ASSEMBLY

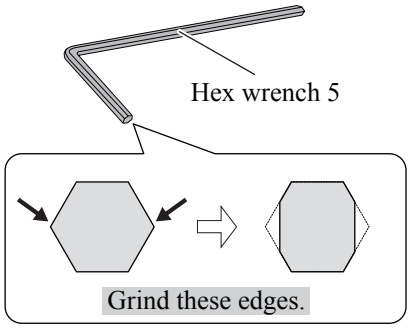
[4]-4. Head case complete (cont.)

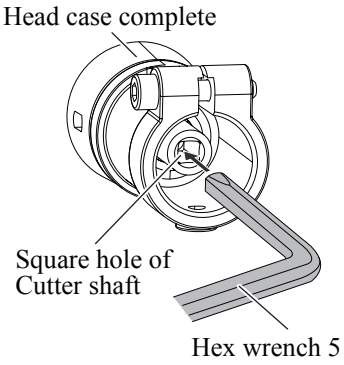
DISASSEMBLING

(2) Disaasemble Cutter shaft and Ball bearings from Head case complete. (**Fig. 10**)

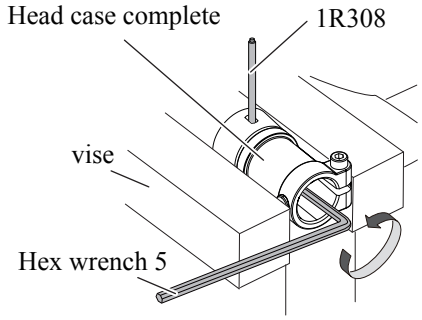
Fig. 10

1. Make Hex wrench 5 square shape by grinding its two diagonal edges and insert it into the square hole of Cutter shaft.

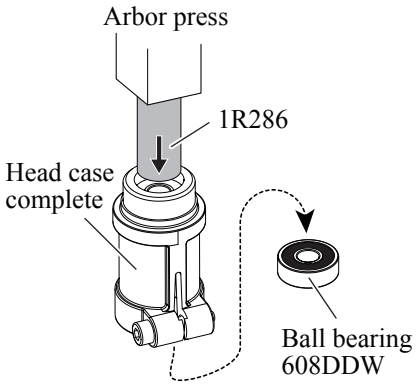




2. Fix Head case with vise and lock Cutter holder with 1R308. Then, turn Wrench 5 counterclockwise and disassemble Cutter holder.



3. Remove Cutter shaft with Arbor press. And then, remove Ball bearing 608DDW by using 1R286.



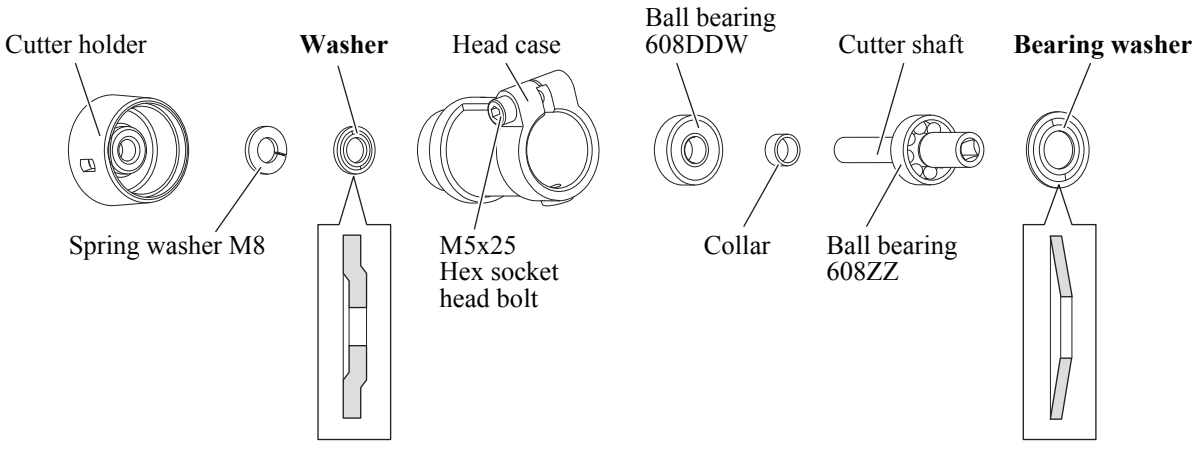
ASSEMBLING

(1) Take reverse step of the disassembly. (**Fig. 10, 11**)

Note: • Pay attention to the assembly direction of **Washer** and **Bearing washer**.

• Shaft end can be fitted into the square hole of Cutter shaft by twisting it with pliers to match their angles without disassembling Head case.

Fig. 11



►Repair

[4] DISASSEMBLY/ASSEMBLY

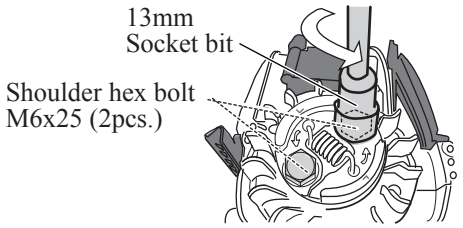
[4]-5. Clutch

DISASSEMBLING

Disassemble Clutch by removing Shoulder hex bolt M6x25 (2pcs) with Cordless impact driver using 13mm Socket bit. (**Fig. 12**)

Fig. 12

Note:
- Clutch is removed with Cordless impact driver without locking Piston.
- Do not remove Spark plug because compressed air resistance in Cylinder is used for Piston locking.
- Remove Plug cap to prevent accidental engine start.

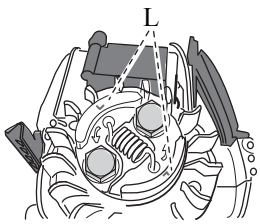


ASSEMBLING

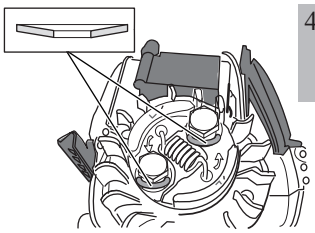
Assemble Clutch by following steps in **Fig. 13**.

Fig. 13

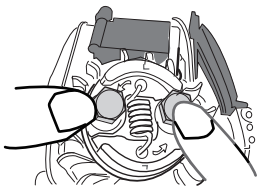
1. Marking “L” on Clutch must face up.



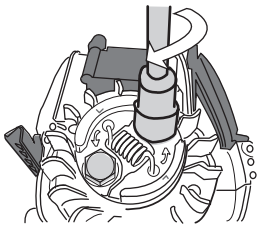
2. Place Washer 8 at described direction.



3. Tighten Shoulder hex bolt M6x25 by hand.



4. Set 13mm Socket bit to Cordless impact driver and tighten Shoulder hex bolts.

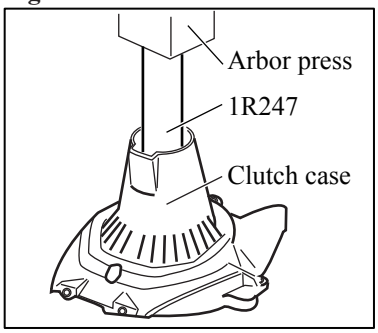


[4]-6. Clutch drum

DISASSEMBLING

(1) Remove Clutch case section from the engine by unscrewing H.S.H. bolt M5x8 (3pcs).
(2) Remove Retaining ring S-12 with 1R004 from Clutch drum in the Clutch case.
(3) Remove Clutch drum from Clutch case section using 1R247 and Arbor press. (**Fig. 14**)

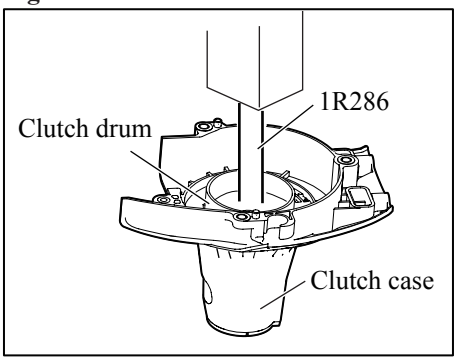
Fig. 14



ASSEMBLING

(1) Put Clutch case on the table of Arbor press vertically, and then, press-fit Clutch drum into Ball bearing 6201LLU with 1R286 and Arbor press. (**Fig. 15**)
(2) Set Retaining ring S-12 in place with 1R004.

Fig. 15



► Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-7. Ignition

CHECKING PLUG CAP

(1) Remove Plug cap from Spark plug and test the continuity between Plug cap spring in Plug cap and Earth terminal of Ignition coil.
It is in order when Tester shows 2.0kΩ±0.5kΩ.(**Fig. 15**)
(2) In case of no continuity or unstable continuity, check the connection between Plug cap spring and Ignition coil as follows:
(A) Spray the lubricant in Plug cap, then pull out Plug cap spring together with Ignition cable using Long-nose pliers. (**Fig. 16**)
(B) In case no connection or inconsistent connection, check the condition of Plug cap and spring.
Reassemble them or replace them if they are disorder.
(C) Insert the end of Plug cap spring into Ignition cable, then return them back to the inside of Plug cap carefully so as not to be disconnected.
(D) Check Plug cap and spring again according to the step of (1) to avoid poor connection causing the poor sparks of Spark plug.

Fig. 15

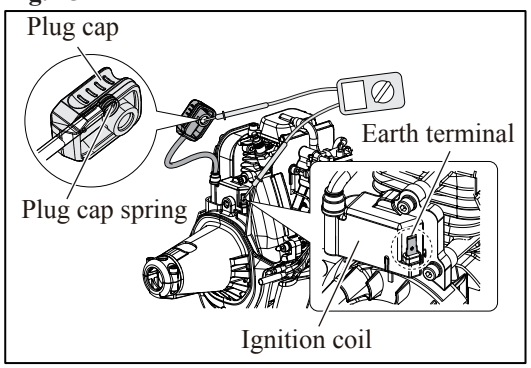
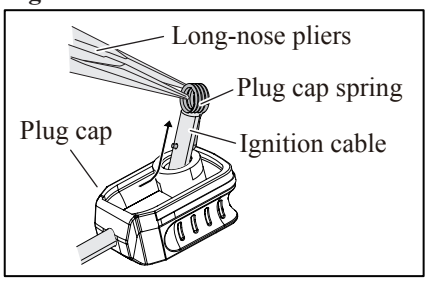


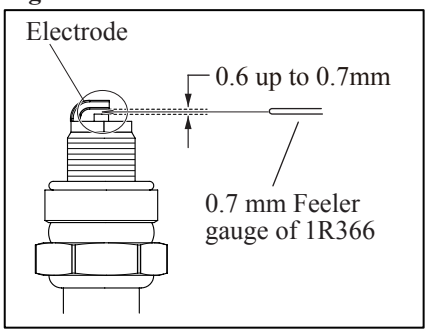
Fig. 16



CHECKING SPARK PLUG

(1) Remove Plug cap with Plug cap spring, then remove Spark plug with Box driver 15-17 (standard equipment).
Note: If the electrodes are wet with Fuel, wipe it away with a cloth and dry it by air blow.
(2) Clean carbon deposits on Electrodes on Insulator tip with a wire brush.
(3) Do fine adjustment of a gap between Side electrode and Center electrode of Spark plug by inserting 0.7mm Feeler gauge of 1R366. (**Fig. 17**)
(4) Mount Plug cap with Plug cap spring on Plug terminal and connect Screw part of Plug to a metal part of Engine, then pull Starter rope slowly. The sparks can be seen when starter rope is pulled.
(5) When the sparks can not be seen, follow the procedure of [CHECKING PLUG CAP] to test the continuity. If it has yet to be solved, replace Plug and recheck the ignition through the above process.

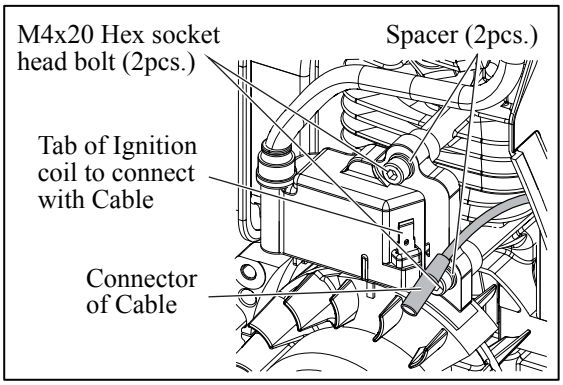
Fig. 17



DISASSEMBLING OF IGNITION COIL

(1) Remove Cylinder cover and cable from Ignition coil terminal.
(2) Loosen M4x20 Hex socket head bolts (2pcs) and remove Ignition coil from Engine. (**Fig. 18**)
Note: Do not lose Spacers for heat insulation (2pcs) on the bolts.

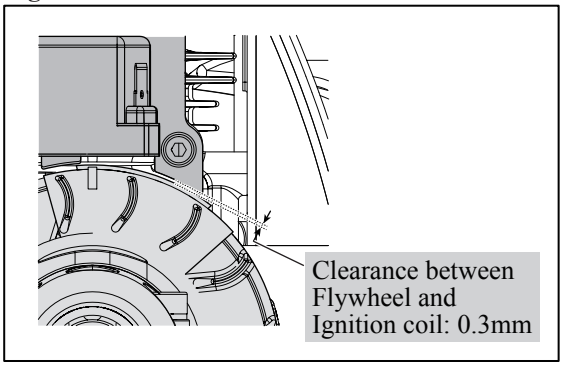
Fig. 18



ASSEMBLING OF IGNITION COIL

(1) Insert 0.3mm Feeler gauge of 1R366 in between the magnet portion of Flywheel and Ignition coil. Tighten M4x20 Hex socket head bolts (2pcs) while keeping Ignition coil attached to Flywheel through 0.3mm thickness gauge.
Note: Two M4x20 Hex socket head bolts (**Fig. 19**) are with threadlocker. Therefore, when re-using them, apply ThreeBond 1342 or Loctite 242 to the threads.
(2) After setting Ignition coil, remove the thickness gauge, then turn Flywheel by hand to check if it turns smoothly without being stuck.
Note: Be sure to insert Spacer on M4x20 Hex socket head bolt when fastening Ignition coil to Engine. (**Fig. 18**)
(3) Assemble Cylinder cover to Engine.

Fig. 19



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-8. Flywheel

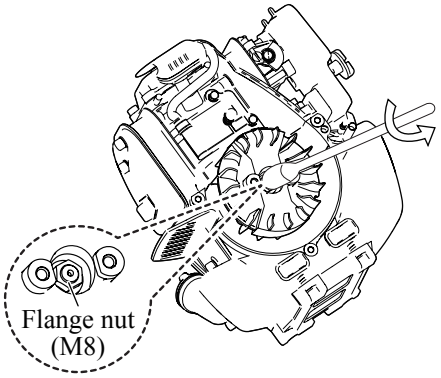
DISASSEMBLING

Remove M8 Flange nut and pull out Fly wheel with 1R364. (**Fig. 20**)

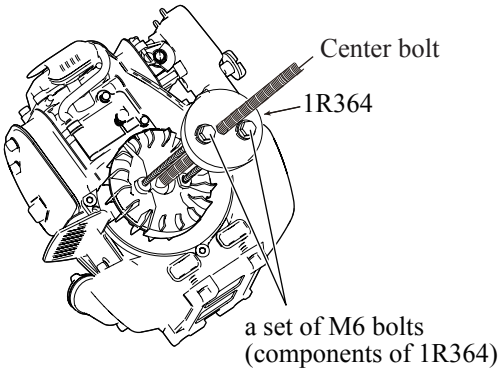
Fig. 20

1. Remove M8 Flange nut by turning it counterclockwise using Cordless impact driver with 13mm Socket bit.

Note: • M8 Flange nut can be loosen easily with Impact driver without locking Piston.
• Do not remove Spark plug because compressed air resistance in Cylinder is used for Piston locking.
• Remove Plug cap to prevent accidental engine start.



2. Set 1R364 by screwing a set of M6 bolts to Flywheel equally, and pull out Flywheel from Crankshaft by turning center bolt of 1R364 clockwise.

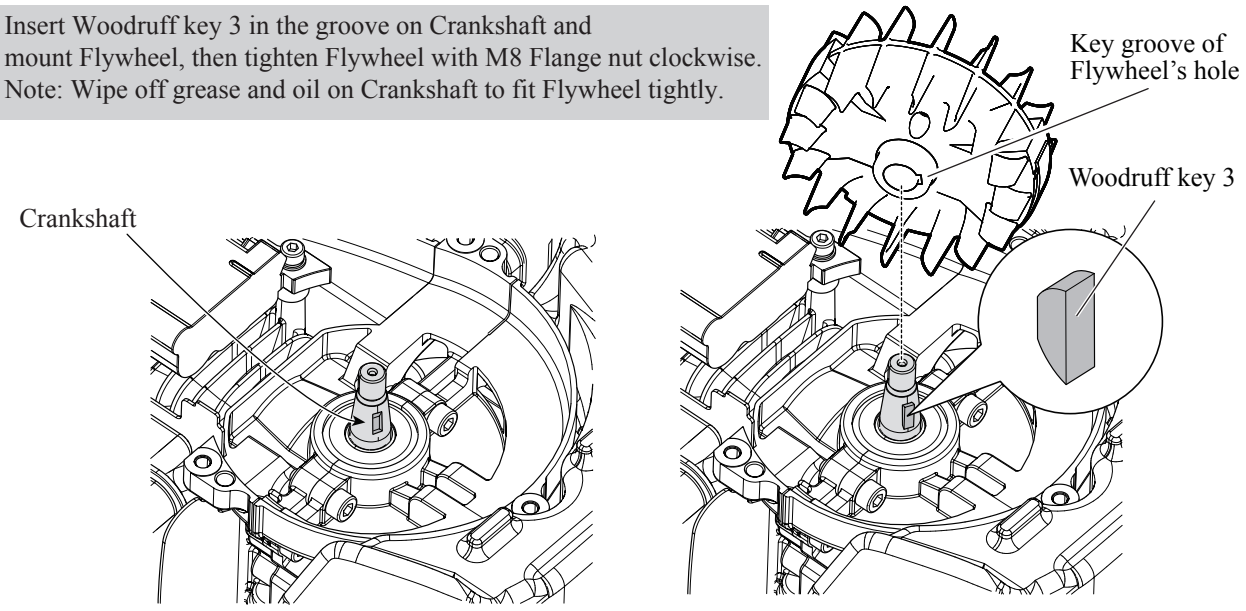


ASSEMBLING

Assemble Flywheel to Crankshaft by following the procedure in **Fig. 21**.

Fig. 21

Insert Woodruff key 3 in the groove on Crankshaft and mount Flywheel, then tighten Flywheel with M8 Flange nut clockwise.
Note: Wipe off grease and oil on Crankshaft to fit Flywheel tightly.



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-9. Recoil starter

DISASSEMBLING

Remove Recoil starter assembly from Engine unit and disassemble it. (**Fig. 22**)

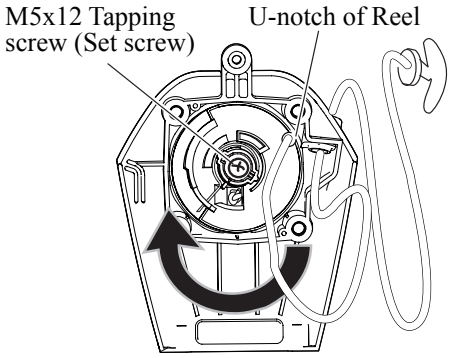
Fig. 22

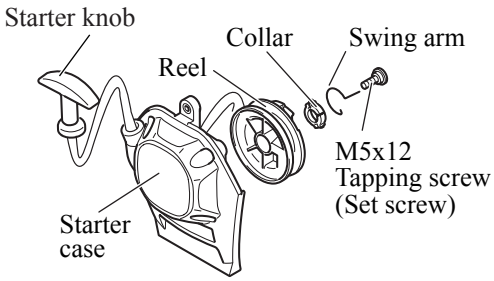
1. Remove Recoil starter assembly from Engine unit. Then, pull out and cut Starter rope if it is still wound on Reel. In case the Starter rope can not be cut, pull it for a length of one round of Reel and hook it in the U-notch, then turn the Reel clockwise until Spiral spring is loosened.

2. Remove M5x12 Tapping screw and Swing arm, Collar and Reel from Starter case.

Note: Be careful if Spiral spring jumps out.

3. Loosen rope knots in the Starter knob and Reel, then remove the rope.





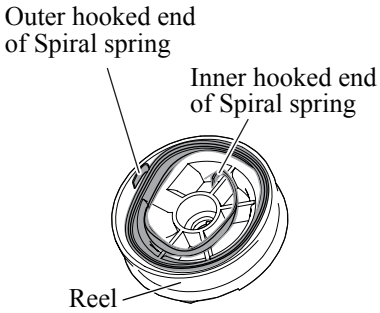
ASSEMBLING

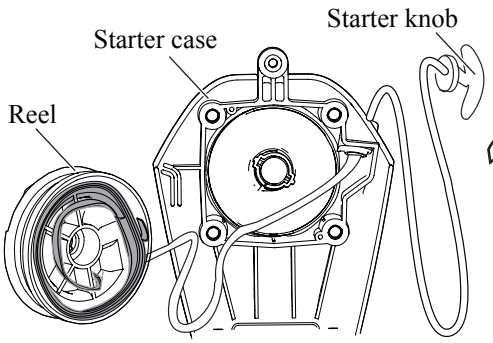
Set Spiral spring in Reel if it is out of Reel and assemble Recoil starter assembly, then wind Starter rope by using recoil force of Spiral spring.

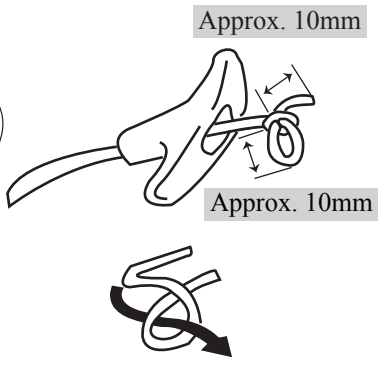
Fig. 23

1. First, set Outer hooked end of Spiral spring in Reel and wind it clockwise toward center of Reel. Set Inner hooked end of Spiral spring on the rib inside of Reel.
2. Apply Makita grease N No.2 a little to the entire Spiral spring.

3. Pass a new Starter rope through Starter case and Knob, then make knots at both ends







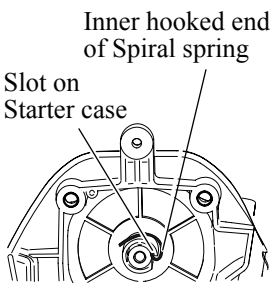
4. Wind the rope with Reel for 2 to 3 turns and fix Reel in Starter case while turning it left to fit the inner hooked end of Spiral spring in the slot on Starter case.

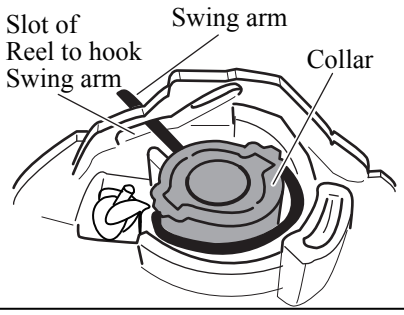
Note: Reel should be fixed without force.

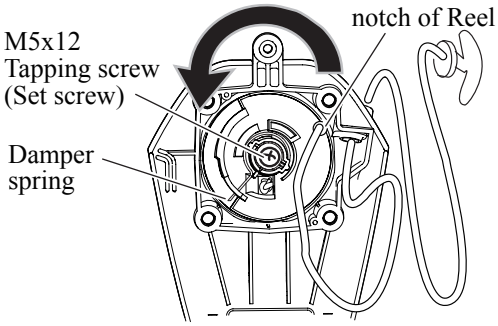
5. Mount Collar to Reel and pass the arm of Swing arm in the slot of Reel, then fix them to the Reel with M5x12 Tapping screw.

Note: Repeat the step 4 to 5. in case the movement of Reel is not smooth after the screw is tightened.

6. Hook the rope in the notch of Reel and turn Reel counterclockwise by using the rope as handle. The rope is wound by recoil force of Spiral spring when it is released from the notch. Repeat the step till the rope is wound up completely.







Repair

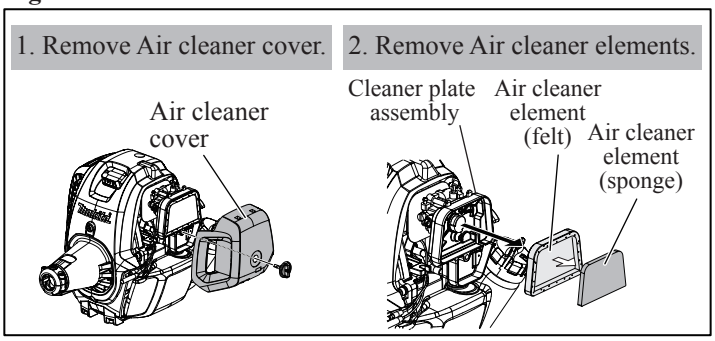
[4] DISASSEMBLY/ASSEMBLY

[4]-10. Carburetor

DISASSEMBLING

(1) Remove Air cleaner cover and disassemble Air cleaner. (**Fig. 24**)
(2) Remove H.S. button head bolt M5x60 (2pcs) completely, then disassemble Carburetor and Cleaner plate assembly from Insulator.
(3) Disconnect two tubes from Carburetor.

Fig. 24



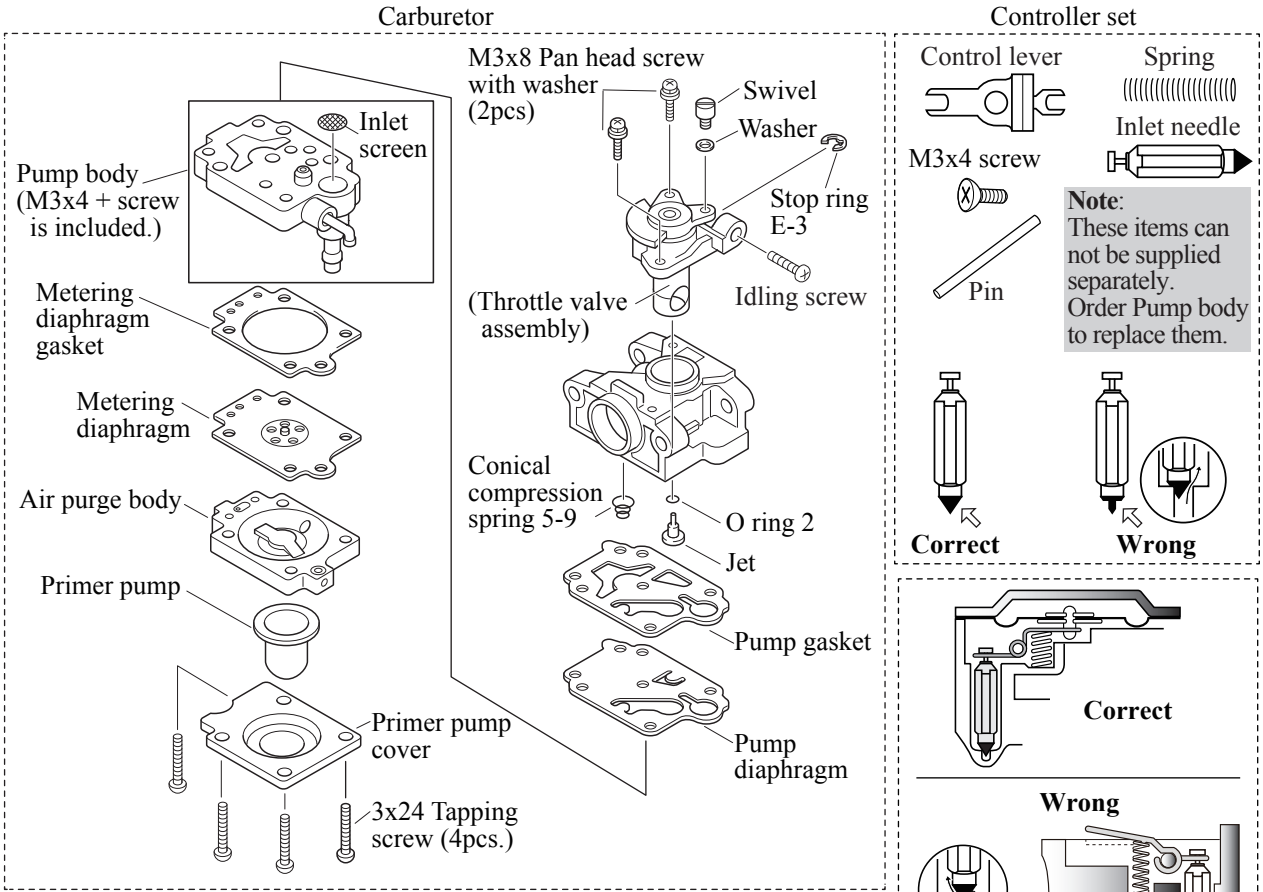
CLEANING / MAINTENANCE

(1) Do regularly Carburetor cleaning and maintenance by following the procedure in **Fig. 25.**

Fig. 25

1. Remove 3x24 Tapping screws (4pcs) and Primer pump cover, then Diaphragm gasket set.
Note: Carefully remove Metering diaphragm when the Gasket sticks to it as it's fragile .
2. Replace Metering diaphragm when it is:
• slackened, • hardened, • worn, • debased.

3. Disassemble Controller set by removing a M3x4 screw from Pump body assembly.
Note: Check the tip of Inlet needle if it is worn or deformed before assembling.
4. Make sure if Spring is set on the projection of Control lever when they are assembled.



5. Loosen Idling screw fully first, then remove M3x8 P.H. screws (2pcs.).
6. Check and clean Inlet screen before fitting.
7. Spray Carburetor cleaner each inlet openings and leave it for a minutes, then wash them with gasoline.

Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-10. Carburetor (cont.)

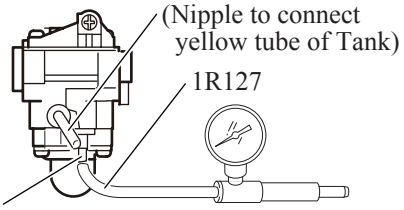
ASSEMBLING

Carefully assemble each part in right direction and order. (**Fig. 25**)

AIRTIGHT TEST

Connect 1R127 to the nipple of Carburetor as drawn in **Fig. 26**.
Give air pressure from 1R127 and check if the pressure gauge indicates 0.05Mpa for around 10 seconds, then there is no problem with Carburetor.

Fig. 26



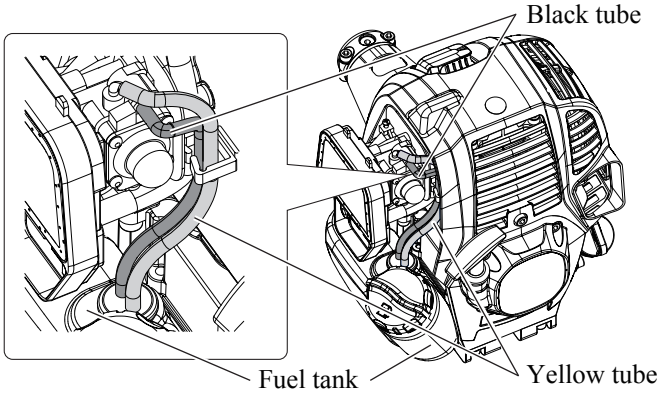
ASSEMBLY TO ENGINE

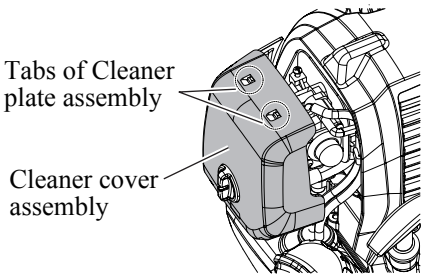
(1) Assemble Cleaner plate assembly, Carburetor and Gasket to Insulator with two M5x60 Hex socket head bolts.
(2) Connect tubes (black & yellow) of Fuel tank to the nipple of Carburetor, then connect Pipe from Cylinder and Breather pipe to Cleaner plate. (**Fig. 27**)
(3) Set Air cleaner elements (sponge at cover side & felt at engine side) in Cleaner plate and fix Cleaner cover assembly. (**Fig. 27**)

Fig. 27

1. Connect two tubes (black & yellow) of Fuel tank to the nipple of Carburetor, then connect Breather pipe and Pipe from Cylinder to Cleaner plate assembly.
Note: Make sure two tubes do not interfere with Cylinder cover.

2. Set Air cleaner elements (sponge at cover side & felt at engine side) in Cleaner plate and fix Cleaner cover by fitting two interlocking tabs and slots.





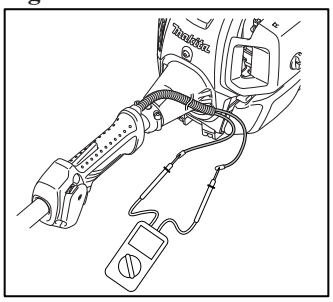
[4]-11. Stop switch

CHECKING STOP SWITCH

Check the continuity of two Lead wires' ends routed from Control lever with Tester. (**Fig. 28**)
Stop switch is in order if it works as following:

- Tester shows no connectivity when Engine **ON**
- Tester shows a connectivity when Engine **OFF**

Fig. 28



[4]-12. Fuel tube

FUEL TUBE ASSEMBLY

(1) Assemble Tube complete; black tube & yellow tube through grommet, to Fuel tank. (**Fig. 29**)
(2) Assemble Gasoline filter and Hose clamp to the black tube, then put them into Fuel tank. (**Fig. 30**)

Fig. 29

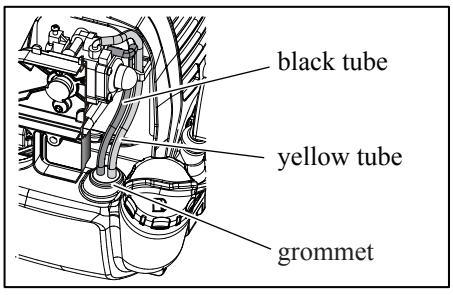
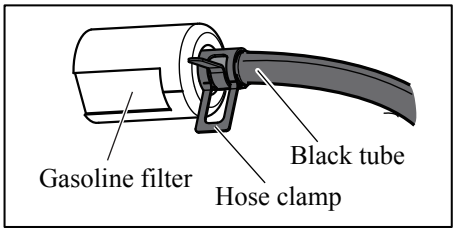


Fig. 30



Repair

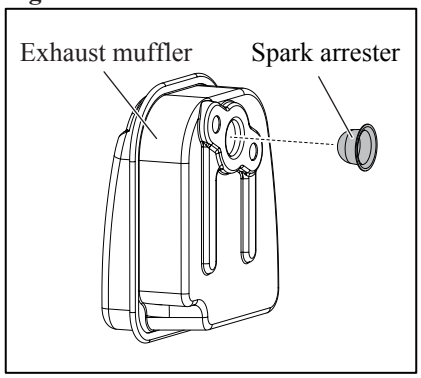
[4] DISASSEMBLY/ASSEMBLY

[4]-13. Spark arrester

MAINTENANCE

(1) Remove Cylinder cover.
(2) Remove Exhaust Muffler.
(3) Remove Spark arrester from Exhaust muffler and sweep it if dirt or soot is on Spark arrester. (**Fig. 31**)
Replace it with a new one if spark arrester has a breakage or fray.
(4) Assemble Spark arrester to Exhaust muffler.
(5) Fix Exhaust muffler in place.
Note: • Do not forget to put Muffler gasket.
• Two M5x40 Hex socket head bolts for fixing Exhaust muffler are threadlocker type. Apply ThreeBond 1342 / Loctite 242 to the threads of Bolts once removed for repair.
(6) Set Cylinder cover in place.

Fig. 31



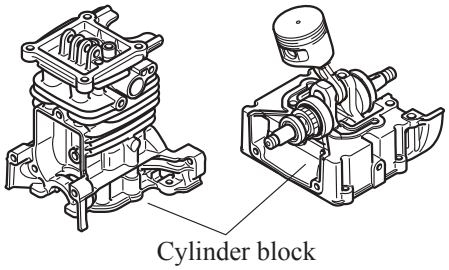
[4]-14. Engine block

DISASSEMBLY

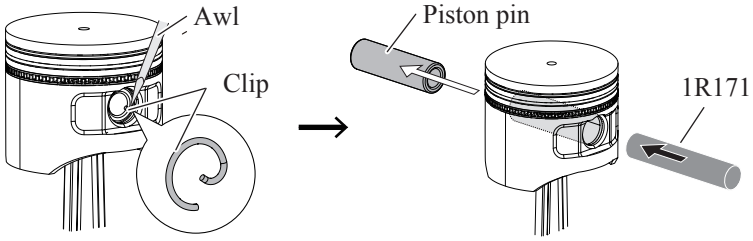
(1) Drain the oil from Engine as much as possible to minimize oil spill out of Cylinder block when opened.
(2) Disassemble Engine and open Cylinder block. (**Fig. 32**)
(3) Disassemble Piston. (**Fig. 32**)

Fig. 32

1. Remove the following parts from Engine:
• Cylinder cover, • Tank guard, • Fuel tank, • Clutch case,
• Recoil starter assembly, • Clutch, • Ignition coil, • Flywheel,
• Rocker cover inner, • Rocker cover gasket, • Rod 2.5,
• Rocker arm assembly, • Cam lifter, • Cam gear, • Insulator,
•Air cleaner, • Carburetor, Muffler, • Spark plug
2. Open Cylinder block by removing M5x16 Hex socket head bolts (6pcs).



3. Remove Clip from Piston with an awl.
Note:
• Be careful if the clip pops out.
• Replace the used clip to the new one once it is removed.
4. Push Piston pin out with 1R171 and remove Piston.



Repair

[4] DISASSEMBLY/ASSEMBLY

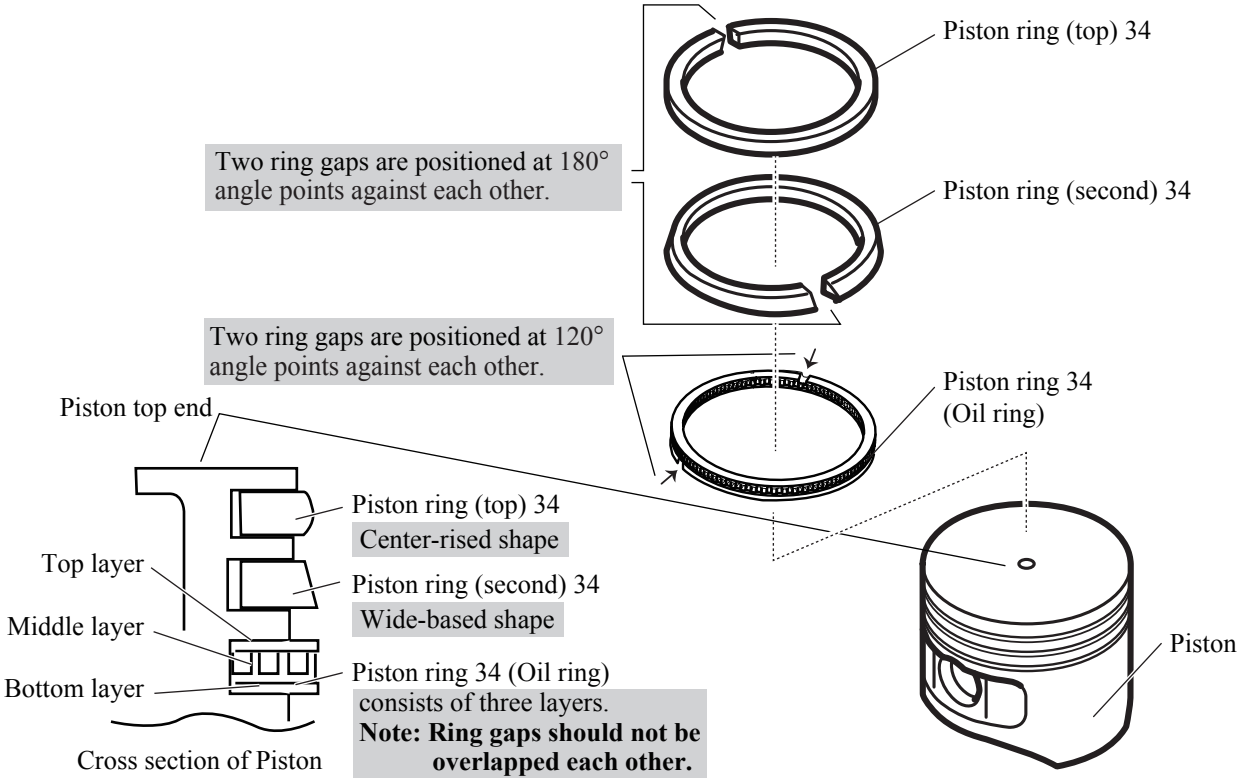
[4]-14. Engine block (cont.)

ASSEMBLING

(1) Assemble Piston to Rod of Crankshaft. **(Fig. 33)**

Fig. 33

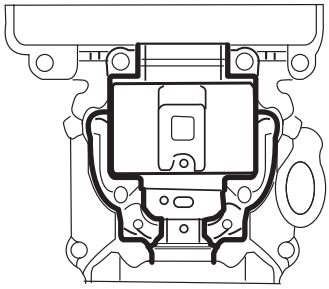
1. Insert Piston pin through Piston and Rod of Crankshaft, and fix it with Clip by using an awl.
Note: • Apply Makita grease N No.2 a little to Needle bearing in Rod of Crankshaft.
• Piston is bilateral symmetry and can be fixed in either direction.
• Clip gap can be located at any position.
2. Install all piston rings at designated position and direction as followings:
• Ring gaps of Piston ring (top) 34 and Piston ring (second) 34 are positioned at 180º angle points against each other.
• Ring gaps of two layers of Piston ring 34 (Oil ring) are positioned at 120º angle points against each point.
Note: Do not expand Piston rings too much as they are easy to break.



(2) Assemble Cylinder block assembly by fastening it with screws in crisscross pattern. **(Fig. 34)**

Fig. 34

1. Degrease the matching surface of Cylinder block and Crank case, and apply ThreeBond 1215 on the Crank case side.
Note: The layer of ThreeBond 1215 has to be thin so as not to enter into the oil route in Engine and get clogged.
2. Apply 4-stroke oil to the contact surface of Piston and Cylinder. And then, install the assembled part of Piston into Cylinder block, while holding Piston rings.
3. Fasten Cylinder block assembly with screws in crisscross pattern.



The matching surface; indicated with black lines

Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-14. Engine block (cont.)

ASSEMBLY

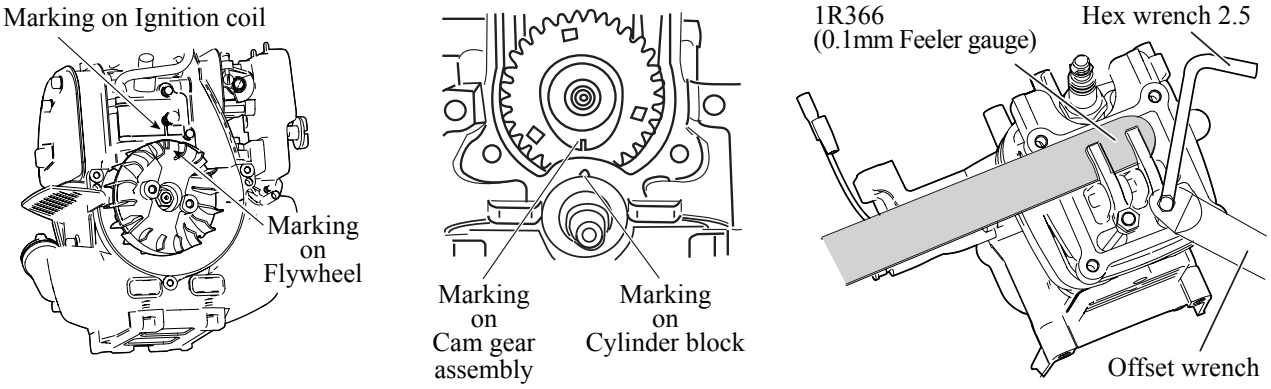
(3) Adjust the valve clearance by following the steps in **Fig. 35**.

Fig. 35

1. Align the markings on Ignition coil and Flywheel.
2. Align the markings on Cam gear assembly and Cylinder block.
3. Assemble Cam lifter (2pcs), Rod 2.5 (2pcs) and Rocker arm assembly (2pcs) to Cylinder block assembly.

Note: Put the ends of Rod 2.5 (2pcs) on the round depression of Cam lifter and Rocker arm, while holding Rocker arm.

4. Loosen the adjust screw of Rocker arm with Hex wrench 2.5 and Offset wrench, and put 0.1mm Feeler gauge (1R366) between valves and Rocker arms, then adjust the valve clearance. Tighten the nuts of Rocker arm assembly and remove 0.1mm feeler gauge (1R366).
5. The clearance is in order if 0.15mm Feeler gauge can not be inserted between valves and Rocker arms.



(4) Take the reverse step of disassembly for Engine block.

[4]-15. Fastening torque

Tighten all parts to designated fastening torques below.

Parts to fasten	Screw/ Nut	Fastening torque: N•m
CYLINDER BLOCK and CRANK CASE	HEX SOCKET HEAD BOLT M5×16	6.0
CRANK CASE and RETAINER PLATE	HEX SOCKET HEAD BOLT M4×10	3.0
CRANK CASE and OIL CASE	HEX SOCKET HEAD BOLT M5×16	6.0
FLYWHEEL and CRANK SHAFT 1	FLANGE NUT M8	16.0
COIL and CYLINDER BLOCK	HEX SOCKET HEAD BOLT M4×20 with SW, W, MEC*	4.0
CAM GEAR COVER and CYLINDER BLOCK	HEX SOCKET HEAD BOLT M5×16	6.0
ROCKER ARM ADJUSTING SCREW and NUT	NUT M5	6.0
ROCKER COVER OUTER and CYLINDER BLOCK	HEX SOCKET HEAD BOLT M5×16	6.0
CLUTCH and FLYWHEEL	CLUTCH BOLT M6×25	9.0
MUFFLER and CYLINDER BLOCK	HEX SOCKET HEAD BOLT M5×40 with W, MEC*	8.0
SPARK PLUG and CYLINDER BLOCK	M10×P1.0	11.0
INSULATOR and CYLINDER BLOCK	HEX SOCKET HEAD BOLT M5×18 with SW, W*	5.0
CLUTCH CASE and CYLINDER, CRANK CASE	HEX SOCKET HEAD BOLT M5×18 with SW, W*	5.0
PULLEY and CRANK SHAFT 2	M8	6.0
RECOIL STARTER and CYLINDER, CRANK CASE	HEX SOCKET HEAD BOLT M5×16 with SW, W*	5.0
MUFFLER PLATE and CRANK CASE	HEX SOCKET HEAD BOLT M5×14 with SW, W*	5.0
OIL PIPE and OIL CASE	HEX SOCKET HEAD BOLT M5×14 with SW, W*	5.0
CONTROL LEVER ASS'Y and SHAFT PIPE COMPL.	HEX SOCKET HEAD BOLT M5×12 with SW, W*	3.0
CONTROL CABLE and INSULATOR	NUT (M6)	2.0

* SW : Spring lock washer
W : Washer
MEC: MEC process (process of locking agent on screws)